Centers for Disease Control and Prevention (CDC)
National Center for Environmental Health (NCEH)
The Folic Acid Campaign

National Folic Acid Program of the National Center for Environmental Health, Centers for Disease Control and Prevention

At-A-Glance 1999

Preventing Neural Tube Defects with Folic Acid: Working Together for Healthier Babies

NCEH Pub. No. 99-0082
May 1999

Scope of the Problem

Spina bifida and anencephaly are the two most common types of neural tube birth defects. In spina bifida, the spine does not close properly during the first month of fetal development. The effects of spina bifida range from mild, with little or no noticeable disability, to severe, with limited movement and function. Babies with anencephaly are born with most or all of the brain missing. They die before or soon after birth.

Folic acid, a B vitamin, is essential for proper development of the neural tube. The neural tube is completely developed by the 3rd to 4th week after conception (about 2 weeks after the first missed menstrual period). This is often before a woman realizes she is pregnant and well before she begins taking prenatal vitamins; therefore, many women will not consume enough folic acid before conception or during early pregnancy to prevent a neural tube defect.

Prevalence of Neural Tube Defects

Each year approximately 3,900 pregnancies are affected by spina bifida or anencephaly:

- 1,500 babies are born with spina bifida
- 400 babies are born with anencephaly and die shortly after
- 1,600 pregnancies are electively terminated after a prenatal diagnosis of spina bifida or anencephaly
- More than 400 babies with spina bifida or anencephaly are stillborn

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Costs of Neural Tube Defects

- Lifetime costs associated with a typical case of spina bifida-including medical care, special education, therapy services, and loss of earnings-exceed $500,000, translating to a total societal cost of spina bifida that exceeds $750,000,000 per year.
- Social Security Administration payments to individuals with spina bifida exceed $82 million per year.
- Tens of millions of dollars are spent on medical care covered by Medicaid and Medicare.

CDC's National Folic Acid Program

There is some good news. If women consume 400 micrograms (mcg) of folic acid *before* conception through at least the first trimester of pregnancy, 50% to 70% of potential cases of spina bifida and anencephaly could be prevented. The National Center for Environmental Health of the Centers for Disease Control and Prevention (CDC) is leading CDC's efforts to prevent these conditions through a National Folic Acid Program. This program includes (1) using birth defects surveillance data to target resources, plan interventions, and evaluate intervention efforts; (2) educating reproductive-age women about how folic acid can prevent spina bifida and anencephaly; (3) building partnerships to conduct and evaluate interventions; and (4) conducting research to plan and evaluate intervention efforts. CDC also founded the National Council on Folic Acid, which coordinates a national effort to prevent spina bifida and anencephaly and is described in a later section.

Benefits of Taking Folic Acid

Helps prevent spina bifida and anencephaly. Taking 400 micrograms of folic acid before and during the first few weeks of pregnancy is the best known way to prevent anencephaly and spina bifida. To meet the daily requirement, women can take a vitamin supplement containing folic acid, eat a fortified breakfast cereal containing 100% of the daily recommended value of folic acid, or carefully plan their diets to increase consumption of other folic acid-fortified foods.

May lower risk for other health problems. All women, whether or not they plan to become pregnant, may benefit from consuming folic acid. Some studies have shown that folic acid lowers levels of homocysteine, a

substance associated with an increased risk for heart disease and stroke. Other studies have suggested that folic acid consumption may lower people's risk for some cancers, such as colon and cervical cancer.

Barriers to Taking Folic Acid

Lack of knowledge About 60 million women of childbearing age are at risk of having a pregnancy affected by spina bifida or anencephaly, but few are aware of the risk:

- Only about 13% know that folic acid can prevent serious birth defects.
- Only about 7% know that folic acid must be taken *before* pregnancy.
- Most don't know that the average diet contains much less than the recommended daily amount of folic acid.

Difficulty in changing behavior. According to a recent March of Dimes/Gallup survey, only about 30% of reproductive-age American women (and only 19% of women younger than 25) are currently taking a folic acid supplement daily. Making folic acid consumption a habit may be difficult when women can't "see" or feel the positive effects. A long-term educational campaign is required to motivate lasting behavioral change.

Lack of guidance by some health care providers. Even though they need to provide their female patients with information about folic acid before pregnancy, many health care providers state that they have too many competing priorities to deliver this preventive message consistently.

Difficulty in taking pills Many women find pills hard to swallow or think that vitamin supplements are an unnatural way to receive vitamins and minerals. Some women find that iron in multivitamins upsets their stomachs, and many well-intentioned women forget to take vitamins regularly.

Strategies for Preventing Spina Bifida and Anencephaly

Surveillance. Public health professionals use surveillance- the ongoing collection, analysis, and interpretation of outcome-specific data- to plan, carry out, and evaluate activities for protecting public health. Through birth defects surveillance systems and research, CDC identifies causes, rates, and patterns of occurrence of various conditions, as well as risk factors for these conditions. Data from these activities serve as an early-warning system for trends in birth defects and possible causes. CDC uses this information to develop screening and prevention programs. CDC programs that track cases of neural tube defects such as spina bifida and anencephaly include the following:

- **The Metropolitan Atlanta Congenital Defects Program (MACDP)**:
  Collects and analyzes data on congenital malformations and adverse pregnancy outcomes in the Atlanta area. The data from this program have been used to make national health policy.
- **National Birth Defects Prevention Network (NBDPN)**:
  Compiles yearly data from states with birth defect surveillance systems (currently about 37 states). Monitors national rates and trends over time and geographic areas.
- **The International Clearinghouse for Birth Defects Monitoring Systems (ICBDMS)**: Monitors birth-defect rates over time across different countries, functioning as an early-warning system for international trends in birth defects.

National Partnerships and Outreach. A successful national campaign to eliminate spina bifida and anencephaly caused by insufficient folic acid consumption would be impossible without the active

involvement of a coalition of committed partners. Current national activities and partnerships include the following:

- **National Council on Folic Acid**. In 1997, CDC formed the National Council on Folic Acid. The council's goal is to prevent birth defects by increasing the percentage of women who take the recommended daily amount of folic acid. The council plans to reach this goal by educating reproductive-age women and their health care providers about folic acid.

The council, which is currently led by the March of Dimes Birth Defects Foundation, includes representatives from advocacy groups and government, health care, civic, and professional associations

National Council on Folic Acid
Steering Committee Members

American Academy of Family Physicians
American Academy of Pediatrics
American College of Obstetricians and Gynecologists
American College of Physicians/American Society of Internal Medicine
American Dietetic Association
American Medical Women's Association
American Nurses Association
American Pharmaceutical Association
Association of Maternal and Child Health Programs
Association of State and Territorial Health Officials
Association of State and Territorial Public Health Nutrition Directors
Association of Women's Health, Obstetric, and Neonatal Nurses
Centers for Disease Control and Prevention
March of Dimes Birth Defects Foundation
National Coalition of Hispanic Health and Human Services Organizations
National Healthy Mothers, Healthy Babies Coalition
Pan American Health Organization
Robert Wood Johnson Foundation
Shriners Hospitals for Children
Spina Bifida Association of America
United States Department of Agriculture

*As of January 1999

- **National Folic Acid Campaign.** In January 1999, the council began a national campaign to raise public awareness about folic acid. Program activities include consultation, policy development, financial support, education, training, and technical assistance.

CDC is developing messages, materials, and distribution strategies for the campaign based on the results of health communications research. This research will help CDC and its partners identify the most effective way to reach their audiences. The council will implement the campaign and recruit additional campaign partners from public health, education, and business.

Examples of these materials include-

- *Preventing Neural Tube Birth Defects: A Prevention Model and Resource Guide*. This comprehensive guide is designed to provide communities with the information necessary for conducting a folic acid promotion program to prevent spina bifida and anencephaly prevention program. CDC provided the guide to state and local health departments, members of community-based and advocacy organizations, and participants at a January 1999 national conference on folic acid.

- *Public Service Announcements*. CDC developed folic acid public service announcements (PSAs) for

television. To determine the PSAs effectiveness, CDC tested the PSA concepts with focus groups of women considering and not considering pregnancy. CDC has also developed radio PSAs, print ads, posters, and brochures in English and Spanish.

- *National Conference*. In January 1999, CDC and the National Council on Folic Acid held a conference on preventing neural tube defects with folic acid. Representatives from government, business, health, and community-based organizations shared their expertise and materials, planned the prevention campaign, and attended training sessions.

State, Territorial, and Local Partnerships. CDC also helps communities to conduct and evaluate educational campaigns and to make folic acid awareness part of preventive health care services to women. CDC provides resources and expertise to territorial, state, and local health departments for developing and evaluating birth defect prevention activities such as the following:

- *Georgia Folic Acid Task Force*. In 1998, this task force conducted a folic acid promotional campaign. The activities included putting folic acid messages in Mother's Day flowers delivered by Teleflora®, placing information tables in shopping malls, and conducting educational activities in Women, Infant, and Children (WIC) clinics. The Georgia Department of Human Resources also provided free folic acid tablets and educational brochures through family planning clinics.

- *Puerto Rico Folic Acid/Neural Tube Defect Intervention*. The Puerto Rico Health Department, Department of Education, and private corporations (e.g., cereal companies, food stores, and drug store chains) are promoting folic acid consumption for spina bifida and anencephaly prevention among women 10 to 50 years of age. About 2,000 health and education professionals have been trained to educate women about folic acid. The health department has also established a data-collection system for tracking rates of spina bifida and anencephaly.

- *Onondaga County, New York Health Department Education Campaign.* This county health department developed a comprehensive folic acid education campaign in conjunction with several community partners. The campaign included activities with media, health care providers, WIC programs, schools, churches, and a variety of businesses. The health department's evaluation of the campaign showed a substantial increase in women's knowledge about folic acid and its role in preventing birth defects and a smaller increase in the number of women who reported taking folic acid-containing multivitamins. The health department plans to use the community coalitions and communications channels established for the folic acid campaign to disseminate other public health messages.

Next Steps

CDC will continue to provide leadership and work with partners to prevent neural tube defects through surveillance, research, education, and evaluation. Next steps include the following:

Education. CDC will work with national and state professional organizations to educate and encourage physicians, nurses, nutritionists, and other health professionals to counsel women to consume folic acid every day. CDC will also work with states, managed care organizations, nutritionists, and others to develop, demonstrate, and evaluate model state and local health communication and nutrition programs for reproductive-age women of various backgrounds.

Infrastructure building. CDC will work with partners in industry, managed care organizations, advocacy groups, and government programs to incorporate folic acid interventions and evaluations into existing programs that provide services to women of reproductive age.

Applied research. CDC will conduct behavioral research to identify barriers to increased use of folic acid supplements and determine strategies for motivating women of various backgrounds to take a folic acid supplement. CDC will conduct research to design and evaluate strategies for training health care providers to

educate their patients about folic acid. CDC will also continue research to determine whether folic acid can prevent other birth defects, such as cleft lip and palate and certain heart defects.

Evaluation. CDC will collaborate with its partners to determine the effectiveness of prevention efforts through (1) periodic surveys of women regarding their use of folic acid supplements; (2) measurements of blood folate levels in selected populations; and (3) monitoring of health outcomes reported by state and national surveillance programs.

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